

ABSTRACT

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METHOD AND APPARATUS FOR CHANNEL ESTIMATION FOR X- DSL COMMUNICATIONS

10 An apparatus and method is disclosed for channel estimation in an X-DSL
communication device. The communication device may include physical or logical
modems. The modems may implement one or more of a group of X-DSL protocols
including G.Lite, ADSL, VDSL, and HDSL. The apparatus may be used for
determining the location and magnitude of discontinuities or faults within the
communication medium to which the X-DSL communication device is coupled. The
information provided by the device may be used for line qualification or repair. No
15 additional equipment is required for channel estimation. Instead the apparatus may be
located within a single modem or shared between a group of modems. An N bit
pseudo random codeword injected into the transmit path is used to generate both a
leakage signal and a plurality of reflected signals on the receive path. No timing
information is needed from the transmit path. Instead a unique correlator is utilized on
20 the receive path to extract timing information for the reflected signals relative to the
leakage signal. The broad bandwidth of the codeword and its relatively long duration
allow channel estimation at significantly higher signal-to-noise ratios and with greater
degrees of accuracy than heretofore possible.